NFPA 70E and the NESC

We all realize (or should realize) that the consensus electrical safety standard NFPA 70E, *Standard for Electrical Safety in the Workplace*, is the premier document for the protection of employees while in their place of employment. But have you ever looked at the exemptions to the 70E in Article 90.1 and thought about the people and areas that it does NOT apply to? Yes, there are exemptions available to certain locales and classifications of personnel and equipment. One of particular interest is the exemption of electric utility workers from the 70E.

First off — who is covered?

From Article 90.1 (Scope) the 70E states:

“This standard addresses those electrical safety requirements for employee workplaces that are necessary for the practical safeguarding of employees in their pursuit of gainful employment. This standard covers the installation of electric conductors, electric equipment, signaling and communications conductors and equipment, and raceways for...”

The standard goes on to describe the areas that are covered, which generally includes most public and private premises and installations, industrial substations, conductors and equipment that connect to the electrical supply, and buildings owned and used by electric utilities that are not an integral part of the generation, control, and transmission of electricity.

While these examples give you an idea of the equipment and personnel to which the standard applies, for the exact listing of the covered installations and personnel classifications refer to Article 90.1 in the 70E.

Who, and what, are NOT covered?

Further, the 70E standard goes on to identify those areas that are NOT covered under the rules of the document. Again, from Article 90.1 the 70E states:

(B) Not Covered. This standard does not cover the following:

1. Installations in ships, watercraft other than floating buildings, railway rolling stock, aircraft, or automotive vehicles other than mobile homes and recreational vehicles
2. Installations underground in mines and self-propelled mobile surface mining machinery and its attendant electrical trailing cable
3. Installations of railways for generation, transformation, transmission, or distribution of power used exclusively for operation of rolling stock or installations used exclusively for signaling and communications purposes
4. Installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations
5. Installations under the exclusive control of an electric utility where such installations:
   a. Consist of service drops or service laterals, and associated metering, or
   b. Are located in legally established easements, rights-of-way, or by other agreements either designated by or recognized by public service
commissions, utility commissions, or other regulatory agencies having jurisdiction

c. Are on property owned or leased by the electric utility for the purpose of communications, metering, generation, control, transformation, transmission, or distribution of electric energy

When looking at Article 90.1(B)(5) it is clear that the electric utilities, other than their buildings not integral to their production operations, are exempt from the requirements of the 70E. While some utilities utilize the guidance found within the 70E, they are not bound to do so, even though arguably some of the highest risks associated with electrical work are the hazards encountered every day by the electric utility worker. Further, while the utility worker is not bound by the 70E, as a part of federal law he still must comply with the applicable requirements of OSHA. (Interesting…isn’t following the 70E what OSHA wants the worker who is exposed to electrical hazards to follow?)

If the 70E does not apply to utility workers, where do they look for information and guidance on installation and work practices for their electrical systems? Enter in Standard IEEE C2-2007, The National Electrical Safety Code (NESC). The NESC statement of purpose is “the practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines and associated equipment. These rules contain the basic provisions that are considered necessary for the safety of employees and the public under the specified conditions. This Code is not intended as a design specification or as an instruction manual.”

Note that “electric supply lines” means utility electrical systems. The scope of the NESC in Rule 011.A states: “These rules cover supply and communication lines, equipment, and associated work practices employed by a public or private electric supply, communications, railway, or similar utility in the exercise of its function as a utility. They cover similar systems under the control of qualified persons, such as those associated with an industrial complex or utility interactive system.”

During the last 70E code cycle there were several proposals that either modified the existing utility exemption in Article 90.1 or proposed to completely eliminate it. The basic argument for the need for modification to the exemption was that electrical hazards are not changed by virtue of the fact you work in one industry or another. Conversely, (generally speaking) the counter argument to exemption modification proposals was that the safety and work practice rules for utility workers is already covered in the NESC. And while there was much discussion and debate on the subject during the technical committee meetings and throughout the public comment period, ultimately the final action was to not remove the exemptions from the 70E as proposed.

So how does the NESC cover electrical hazards and safe work practices, and more specifically, how does the NESC deal with the arc-flash exposures to the electric utility worker in the field?


In the 2007 Edition of the NESC, a new rule was added that specifically addresses a worker’s exposure to arc-flash hazards, and it can be found in Rule No. 410.A.3

Where working on or near energized electrical equipment, the NESC Rule states:

“Effective as of January 1, 2009, the employer shall ensure that an assessment is performed to determine potential exposure to an electric arc for employees who work on or near energized parts or equipment. If the assessment determines a potential employee exposure greater than 2 cal/cm2 exists (see Neal, Bingham, and Doughty [B59]), the employer shall require employees to wear clothing or a clothing system that has an effective arc rating not less than the anticipated level of arc energy.

When exposed to an electric arc or flame, clothing made from the following materials shall not be worn: acetate, nylon, polyester, or polypropylene. The effective arc rating of clothing or a clothing system to be worn at voltages 1000 V and above shall be determined using Tables 410–1 and 410–2 or performing an arc-hazard analysis. When an arc-hazard analysis is performed, it shall include a calculation of the estimated arc energy based on the available fault current, the duration of the arc (cycles), and the distance from the arc to the employee.”
Not a bad rule for the NESC to enforce after January 1, 2009. (It is a fantastic requirement, actually!) But wait! There are some exemptions to these safety-related work practice rules. Again, from the NESC Rule No. 410.A.3:

“EXCEPTION 1: If the clothing required by this rule has the potential to create additional and greater hazards than the possible exposure to the heat energy of the electric arc, then clothing with an arc rating or arc thermal performance value less than that required by the rule can be worn.”

So this possibly gives the worker a “this stuff is too hot to wear” or an “I can’t see very well with all this arc-rating PPE on” exemption to argue. However, if you do, be very careful on how you assess the hazard and apply this exemption, especially when you eliminate personal protective equipment. How would you like to stand in front of a jury and say, “The PPE created an additional hazard and we chose not to wear it because of the increase risks it made for us, but the resulting arc flash injury during the incident killed my buddy. I guess we were wrong.”

If you think that will never happen, look at NESC Rule 410.A.4, which states:

“Employers shall utilize positive procedures to secure compliance with these rules. Cases may arise, however, where the strict enforcement of some particular rule could seriously impede the safe progress of the work at hand; in such cases the employee in charge of the work to be done should make such temporary modification of the rules as will accomplish the work without increasing the hazard.”

It seems as though one of the issues with this rule is the old adage “It’s never to important that it can’t be done safely.” That is, unless it impedes the safe progress of the work at hand.....

But at the end of the day, if you apply the rules effectively but chose to change them for any reason, you are allowed to under Rule 410.A.5 which states:

“If a difference of opinion arises with respect to the application of these rules, the decision of the employer or the employer’s authorized agent shall be final. This decision shall not result in any employee performing work in a manner that is unduly hazardous to the employee or to the employee’s fellow workers.”

But again, if you fall under the rules of the NESC, be very careful about your decisions, and most importantly do not lose sight of the purpose statement of the NESC. It appears as though you can argue that the NESC purpose statement conflicts with some of the “get out” rules, since the purpose in Rule No. 10 states:

“The purpose of these rules is the practical safeguarding of persons during the installation, operation, or maintenance of electric supply…”

“These rules contain the basic provisions that are considered necessary for the safety of employees and the public under the specified conditions.”

“This Code is not intended as a design specification or as an instruction manual.”

The NESC is a fantastic document with many facets to the protection of utility workers, especially with regards to installation practices. However, it seems as though the safe work practices piece, especially with regards to arc flash, is a little too liberal with exemptions to the rules. So what does it all mean? I think the chairman of the 70E committee, Mr. Ray Jones, stated it best when he said, “As the committee moves forward into the future, I encourage you to remain actively engaged in the business of preventing injuries to people. The NEC and NESC do a good job of protecting the general public but only NFPA 70E provides protection to workers when a designed system is not working as intended.”

So whether you are a railroad worker, a utility worker, or a test technician in the field – pick up the 70E and try to gain an understanding of it and how it differs from installation standards such as the NEC and the NESC. The education may save your life.

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